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China's Talent Recruitment Programs: The Road to a Nobel Prize and World Hegemony in Science?, 2015 SITC Research Brief No. 2

## **ABSTRACT**

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# RESEARCH BRIEF

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## China's Talent Recruitment Programs: The Road to a Nobel Prize and World Hegemony in Science?

Liming SALVINO

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One of the most important factors in China's major advances in the quality of scientific research and the capacity for science, technology, and innovation are contributions from top global talent. Chinese leaders see attracting talent as a way to increase Chinese capabilities, realize domestic development objectives, and attain global leadership in science and technology. The Chinese government continues to devote considerable attention to the development of human talent, including the recruitment of overseas Chinese. However, these programs are considered to be a mixed success. This brief provides a summary of a recent study on gauging the effectiveness of China's efforts in this area. It also discusses the impact of recruited talent in helping China to achieve major scientific breakthroughs, such as winning a Nobel Prize in the physical sciences.

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## INTRODUCTION

One of the most important factors in China's major advance in the quality of scientific research and the capacity for science, technology, and innovation (STI) is the contribution from global top talent. Chinese leaders see attracting talent, which has been judged capable of achieving critical scientific and technological breakthroughs, as a way to increase Chinese STI capabilities, to help China realize its domestic development objectives, and to attain global leadership in science and technology.

The Chinese government continues to devote considerable attention to the development of human talent, including the aggressive recruitment of overseas Chinese with programs such as the Thousand Talents Program. During recent years, overseas Chinese talent has returned in significant numbers and is playing an important role in quickly moving China to the status of an emerging global power in science and technology (S&T). However, the talent attraction programs are considered to be a mixed success since only a small fraction of top scientists have returned to China permanently or have committed significant amounts of time to residency in China.

## OVERVIEW OF CHINA'S TALENT ATTRACTION PROGRAMS

Chinese leaders have long valued talent. In a speech on May 22, 2014, President Xi Jinping, said that "China needed to implement a more open talent policy, to bring in talent no matter where it came from, make the most use of it and trust it fully."

China began to create incentives for scientific innovation and to attract overseas talent (called returnees) in the mid-1990s. During this period, the country gradually established a national financial aid and reward system through various innovation/talent at-

traction programs such as Hundred Talents (百人计划), the National Science Fund for Distinguished Young Scholars (国家杰出青年科学基金), and the Cheung Kong Scholars Program (长江学者奖励计划). These programs were sponsored by Chinese S&T entities such as the Chinese Academy of Sciences (CAS), National Natural Sciences Foundation of China, and the Ministry of Education. The Chinese government has significantly increased the scope and intensity of its talent recruitment programs in the past few years with the official launch of the National Medium- and Long-Term Talent Development Plan (2010–2020) on June 6, 2010. As a sign of the serious political commitment to human resource development, Li Yuanchao, a rising star in the Chinese Communist Party, led the preparation of the Medium- and Long-Term Talent Development Plan.

The Organization Department is in charge of the Thousand Talents Program overseas recruitment efforts and is raising the level of benefits, such as long-term multi-entry visas and various personal and professional entitlements. In line with the central government's talent-attracting strategy, local governments have also established and implemented many locally-based talent programs.

China has had some success in attracting talent. A total of 1.09 million people have returned to China since reform and opening started in the late 1970s. According to the China Organization and Human Resources Report (中国组织人事报) published in 2013, 800,000 of these have returned to China during the past five years. Whether due to the talent recruitment programs or other factors, overseas Chinese scholars have returned in noticeably larger numbers in recent years. Between 2008 and 2012, the number of returnees was 69,300, 108,300, 134,800, 186,200, and 272,900 for each respective year, with a 47 percent jump from 2011 to 2012.

## THE THOUSAND TALENTS PROGRAM

The Thousand Talents Program (千人计划) seeks to attract global S&T experts with established records and expertise. It initially included two subprograms and has gradually expanded to six subprograms/categories: 1) the Long-term Plan, which requires at least a six-month physical presence per year in China, for persons under 55 years of age; 2) the Short-term Plan, which requires a three-year commitment to spend at least two months in China per year; 3) the Entrepreneurial Plan, which is designed to recruit talent for high-level positions in high-tech industries; 4) Foreign Experts, which is a program to bring non-ethnic Chinese experts under the age of 65 into core technology areas; 5) Young Talents, which requires returnees to be under 35 years of age; and 6) Outstanding Talents, for those who have already obtained world-recognized research prizes. This program requires a commitment to work full time in China for five years.

Typically, individuals recruited through these programs are paid high salaries that are competitive with Western standards, are given housing, and are provided very large research grants. As the Thousand Talent Program is ministered and coordinated at the national level, it has been more successful in bringing back overseas talents compared to all previous talent attraction programs.

## THE TEN THOUSAND TALENTS PROGRAM

China launched its newest and most ambitious program, the National Special Support Program for High-level Talents, also known as the Ten Thousand Talents Program (万人计划), to further talent recruitment efforts, in September 2012. The program contains three tiers and over a 10-year period aims to select: 1) 100

“outstanding talents” who have the potential to become world scientific leaders and to win a Nobel Prize in science; 2) 8,000 “leading talents” for scientific and technological innovation; and 3) 2,000 “young talents” who are under the age of 35. The new strategy uses “a two-handed grab” approach: one focuses on overseas talents and the other on rewarding grand achievements of home-grown STI professionals. Each tier/reward category includes top overseas scientists and professionals recruited under all previously issued talent plans. The first batch selected for the program was officially unveiled on October 30, 2013, and includes 6 “outstanding talents,” 72 “leading talents,” and 199 “young talents.”

## ARE TALENT PROGRAMS SUCCESSFUL?

China has had mixed success in its various attempts to attract global talent. On one hand, the incentives of talent programs do have drawing power. In addition to the significant prestige attached to “Thousand Talents” recognition, the financial benefits are substantial.

To provide a better evaluation of the current Chinese talent recruitment process, extensive research was undertaken to collect data and conduct assessments, including visits and interviews with Chinese scientists and tours of university research laboratories in Beijing, Shanghai, Nanjing, Harbin, Lanzhou, Guangzhou, and Shenzhen to better understand how returnees are fulfilling expectations and what their impact may be on advancing STI in China.<sup>1</sup>

A top CAS official claims the academy attracted 2,493 returnees from 1994 to July 2013. He commented: “For those selected through these programs, we pay them 2 million

yuan (\$326,000) as a startup fund and 600,000 yuan for resettlement, making their research and living conditions as good as they are abroad.” The academy also has the 3H Project, which aims to relieve overseas experts’ housing and health concerns and give them a feeling of being at home.

Although decisions to relocate are often driven in part by family and cultural considerations, some academic contacts said the benefits they were offered as Thousand Talents were decisive. Senior researchers with a proven record of achievement often have reached eligibility for retirement in the United States, and thus they can retain their pension and position at a U.S. university while also benefiting from generous funding and second career opportunities in China. As an example, one expatriate, a world-leading scientist who retired from a U.S. government R&D lab, is now working at Shanghai Jiaotong University under a three-year commitment. Others may see short-term opportunities by appropriately using their sabbatical time to work in China. The Chinese institution, meanwhile, gains prestige and may benefit from future research and teaching experience. Some returnees are satisfied with their positions in China. One contact who moved to Tsinghua in 2003 after a 20-year career in the United States said that his academic freedom and funding allowed him to accomplish his research objectives and make as much progress as he would have made in the United States.

However, the talent programs have not met expectations for large-scale repatriation of high-caliber talent. For example, the Thousand Talents Program has enrolled 4,000 recruits, and all talent initiatives, including local programs, have enrolled 20,000; yet more than 1.5 million Chinese scholars remain abroad. Multiple contacts noted that most returnees seek to maintain their careers abroad as well as take advantage of opportunities in China, working in

China only on a temporary basis. A Thousand Talents contact from Hong Kong “returned” to a Shenzhen institute under the “Long-term Plan,” but also maintained his position at a Hong Kong university by doubling his work hours and using vacation time to fulfill his 6-month obligation. Another Thousand Talents contact said that he agreed to work three months per year in Qingdao, but actually spent only a few weeks per year in residence. Chinese institutions are often content with this arrangement, as they can use the names of these returned scientists to improve their evaluations and qualify for government funding.

Visas were one of the top issues cited by contacts as an impediment to the success of the talent recruitment programs. One U.S. citizen returnee noted that, despite official government assistance, he has faced numerous logistical hurdles in settling in China, including issues with short-term visas and problems enrolling his children in school. In July 2013, China introduced a new “talent visa” intended to improve the situation, but this new visa category has a maximum validity of five years and does not confer immigrant status.

## IMPACTS OF RETURNEES ON ADVANCING CHINESE S&T

Returnees have played a pivotal role in modernizing and globalizing China by making landmark contributions to the advancement of Chinese S&T, education, culture, and health. Most returnees have kept international connections and are well aware of international developments in S&T. Their work has lifted China’s global academic reputation.

China’s strong showing in nanotechnology and clean energy technologies may be an early indication that it is poised to become increasingly prominent in new areas of S&T. Currently, the United States is still the recognized world leader in many fundamental fields of S&T. For example, the United States is a clear lead-

1. Liming Salvino, “China’s Intensified Talent Recruitment Efforts: Thousand Talents to Ten-Thousand Talents and the Aim for Major Scientific Breakthroughs” (Office of Naval Research Global, January 2014).

er in synthetic biology—one of the predicted “disruptive technologies.” However, the U.S. lead in synthetic biology is largely due to the first mover advantage in a nascent field. A returnee recruited by the Thousand Talents Plan, a prominent synthetic biologist from the University of California San Francisco, now runs a second substantial laboratory at Peking University. The race to leadership in synthetic biology may largely be a race to scale up and institutionalize collaboration and cooperation, as China is doing in genomics.

One member of the first batch of “outstanding talents” in the Ten Thousand Talents Program is Liu Zhongfan, director of the Institute of Physical Chemistry at Peking University. He is a returnee, one of the younger CAS academicians, and has made significant contributions to nanochemistry/low dimensional materials. Liu said that basic S&T in China before 2000 was so backward and behind that the road ahead seemed long and endless—never able to catch up was his feeling at that time. Since 2010, after ten years of learning and hard work, he now feels that he is running on a par with his international peers. Today, it is becoming recognized that world-class S&T research is being achieved at the top Chinese research institutions.

### ATTRACT TALENTS, REFORM S&T: A ROAD TO MAJOR SCIENTIFIC BREAKTHROUGHS?

China’s goals of becoming a world leader in S&T and spurring innovation are encapsulated by the quest for a Nobel Prize in the physical sciences. Despite the money China has poured into science, and rapid leaps in the scientific publication race, the symbol of the highest achievement and originality represented by a scientific Nobel Prize has so far eluded Chinese nationals. CAS has 60,000 employees, with a large percentage of

returnees, and is under high pressure to achieve scientific breakthroughs. CAS President Bai Chunli said in 2013: “I am more concerned about when the Chinese scientific community will make an innovative, Nobel Prize-level breakthrough.” Bai has set some ambitious goals since becoming CAS president and has launched many reforms.

Groups of scientists at the Acoustic Institute of CAS in Beijing and Shenzhen Institute of Advanced Technology in Shenzhen who were interviewed for the study explained the “One-Three-Five” reform initiatives introduced in January 2013 by Bai. “One” refers to an effort to review the S&T portfolio for all CAS institutes, instructing each institute to focus on its best or strongest area. “Three” is the mandate for each institute to address three important national S&T challenges and thus solve three national-level current or emerging problems by 2015. Many acknowledge that this is a very ambitious goal, but CAS top-tier management demands achievement of at least one of the three, which must be independently recognized as a next-generation technology and scientific breakthrough. “Five” goals must be identified that involve longer-term national S&T challenges that the institute will tackle.

CAS continually makes unprecedented reforms to turbocharge research. The 2014 reforms have grouped research into four categories, and promising CAS scientists are selected to work together under them. The scientists will see their salaries jump, relying on grants for only 30 percent of their income rather than 70 percent. This shift attempts to incentivize scientists to collaborate on fewer, but larger, problems.

The first category is devoted to establishing centers of excellence focused on basic science, and will target areas in which China has a chance to dominate. One team, for which 40 researchers have been selected from 11 different CAS institutes, specializes in

brain science. A second category will target areas with underdeveloped commercial potential, including microsatellites, marine information, and drug development. A third category will establish collaborations around large-scale facilities. For example, a synchrotron and a protein-science center will be linked to make it easier to carry out high-precision protein studies. The fourth category, still in the design phase, will be devoted to initiatives that assist local development and sustainability.

Many Chinese scientists are aware that a Nobel Prize is not a goal that lends itself well to central planning. Scientists have been vocal in criticizing the government’s emphasis on “planned achievements” and designating certain scientists with Nobel Prize potential. The emphasis on “metrics” is creating problems for the S&T environment that is supposed to win a Nobel Prize. A top complaint is that China’s current research environment is not conducive to innovation—excessive competition results in significant amounts of valuable time wasted on fighting over resources, seeking quick success, and boosting publication counts rather than maintaining a focus on long-term fundamental research. The evaluation is only based on counting the “impact factor” of papers in international Scientific Citation Index (SCI)-ranked journals. In fact, a group of scientists in Shanghai mentioned that day-in and day-out, they live by SCI numbers which, they joked, stands for “Stupid Chinese Information.”

Some scientists interviewed for this study suggest that the Ten Thousand Talents Program could be a step in the right direction for S&T reform, eliminating bureaucracy and providing a longer period of stable funding and greater freedom for researchers. While there is no indication that insider and political connections will cease to matter under the Ten Thousand Talents Program, it will at least reduce the volume of paper-

work required from researchers under the current project-based system.

Some scientists, however, had mixed feelings about the reforms. They welcomed initiatives to increase non-competitive funding to reduce time spent on proposals, but they also maintained that such efforts to reduce competition could result in more “top-down-directed research,” which they feel would be a step backward.

## CONCLUSION

All the scientists interviewed for this study emphasized that the improvement of scientific research re-

quires much more than money. They stressed that changing the current scientific research environment, particularly the scientific evaluation system in China, is critical. If the scientific evaluation mechanism does not allow free exploration, China cannot lead in S&T and innovation. Achieving world leadership in S&T, in their opinion, will be a long-term task. More open policies, a better research environment, an improved educational system, and more investment in human resources to nurture outstanding talent would improve the situation.

Despite increased pressure from top management to produce high-

quality research products, these scientists think the current Chinese S&T level is still a long way behind current leaders such as the United States, and most think that reform is desperately needed. Without overhauling the current research system and culture in China, it is not likely that the talent attraction initiatives will be sufficient to achieve China’s S&T leadership goals and produce Nobel Prize-winning research.

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